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**Evaluation of Hazard Tree Removal at Jackson Meadows Recreation Area
and Annosus Root Disease and Stand Management in Yuba Pass Campground,
Tahoe National Forest, Sierraville Ranger District
FPM Evaluation # NE98-14**

Bill Woodruff, Plant Pathologist

On July 9, 1998, I evaluated the hazard tree removal operations at Jackson Meadows Recreation Area and the annosus root disease and stand management in Yuba Pass Campground. I was accompanied by Rachel Condon, District Timber Sale Administrator for Sierraville Ranger District.

Jackson Meadows:

Rachel pointed out three large Jeffrey pine trees near the entrance to the Jackson Meadows administrative site. She wanted to know if they were hazardous. All three are very large and old with thinning crowns. None of the trees appeared to be hazardous at this time. All three should be examined annually during the District's pre-season campground inspection where tree hazards are identified and removed. It is likely that these trees will die in the next ten or twenty years as a result of natural forest disturbances like drought and/or bark beetle attack. At that time they will have to be removed. In the meantime, any change in the trees' health or public use patterns which cause these trees to be hazardous should be addressed. For example, if large branches die and they are located over visitor activity areas, they should be pruned from the tree. Or, if the angle of lean of a particular tree noticeably increases over a short time, the tree should be removed.

Rachel asked me to evaluate the hazard tree removal operations in a nearby Forest Service campground. Since the hazard trees were already removed I examined the stumps and found many with visible defects. I was told that this campground was similar to an adjacent private campground before the hazard trees were removed. There is a big improvement. The untreated campground had numerous trees with defects (dead trees, trees with dead tops, trees with excessive lean, etc). I saw no trees with major defects in the treated campground. I



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pointed out a few minor tree defects to Rachel which can be removed in future years. Note: During my inspection, I observed that borax is being applied to freshly cut stumps as required by Region 5. Treating stumps with borax is one way to prevent annosus root disease from becoming established in healthy root systems. Boraxing stumps is often over-looked in campgrounds. I would like to commend Rachel for seeing that the freshly cut stumps were boraxed.

I wish to commend the Sierraville District for aggressively treating hazard trees at Jackson Meadows. All too often, campground managers retain defective trees past the point of failure because they believe the public wants to camp amongst numerous trees and would prefer that those trees be large and old. While this may be true for some visitors, the "bottom line" is that most visitors assume the campgrounds are safe. The Forest Service may be liable for damage or injury from predictable tree failure, when we charge for campground use, if we fail to diligently look for and treat tree hazards in our use areas. Over and above legal ramifications, we want all our facilities to be safe for everyone. That is why we look for hazard trees in our recreation sites and remove them (or move potential targets) before visitors arrive.

Yuba Pass Campground:

Rachel and I then visited Yuba Pass Campground. Yuba Pass Campground is in an old growth California red fir stand. The old red fir trees are over 110 feet tall and 36 inches dbh, with densities over 300 ft²/acre basal area in spots. There is evidence of some older windthrow in the red fir. Patches of red fir regeneration occur in openings created when dead and dying trees were removed except in the area near the entrance that was used for a landing to deck and load the logs. The regeneration varies from many seedlings and saplings to a few pole-sized trees. The stand borders a meadow. Lodgepole pine trees are growing at the edge of the meadow and an occasional ponderosa pine is growing amongst the red fir.

A number of large stumps remain from red fir that died over the years and then were felled for safety. Many of the stumps had very large cavities in them from root and butt rot. Annosus root disease was identified from conks of the fungus, Heterobasidion annosum found in one of these hollow stumps. A large butt log with butt and heart rot lay near the entrance. The butt rot probably resulted from annosus root disease. Most likely another fungus caused the heart rot which appeared to have entered through a long vertical crack in the stem. This tree and another with butt and heart rot that had broken in the wind had a pronounced butt swelling. A number of the large standing red fir had similar butt swells as well as thinning foliage and branch dieback in the crowns. I cored several of these trees with butt swells with an increment borer. One of the cores revealed rot a few inches in, and another showed some discoloration which can be an indication of early decay. In this campground, red fir trees with pronounced butt swells appear to have advanced decay in the base. Fir with crown dieback and obvious butt swelling should be suspected of having extensive heart rot. Any trees with advanced decay can be hazardous to visitors and should be removed if they are located near activity areas (eg. tent pads, picnic tables, parking).

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The only way to completely control annosus root disease is to remove all the host trees from an affected area for thirty to fifty years. This is usually not necessary with true fir since annosus root disease usually does not kill true fir. An infected fir tree can survive indefinitely as long as it remains vigorous and grows sound wood on the outer diameter faster than the disease decays the tree from the inside. Also true fir regeneration can often survive in openings in infected stands. The only time it becomes necessary to remove all the host fir trees and start over is when a group of trees is severely impacted by root disease and the management objective is to maintain sound and vigorous trees there. This is starting to be the case in parts of Yuba Pass Campground. Advanced decay like that seen in many of the stumps at is seriously weakening some of the trees. Fir trees with much decay that are close enough to fall on camping sites or facilities need to be removed for safety. Individual red fir trees with a small amount of decay can remain in the campground until root disease kills or severely weakens them. At that time they must be removed for safety. Over a number of decades the large infected red fir in the campground will be lost and replaced by young vigorous red fir that naturally seed into the openings left by the removed trees. Some of the regeneration may die when their roots contact infected roots, but much of it will survive the disease and grow to maturity if tree vigor is maintained using silviculture.

Some of the large red fir were infected with true fir dwarf mistletoe, Arceuthobium abietinum f.sp. magnifica. This parasitic plant is not seriously affecting the host red fir, but it is capable of infecting red fir regeneration growing within 100 feet from infected trees. Small fir infected with dwarf mistletoe may have a hard time reaching maturity if the disease grows from a branch into the main stem. Survival can be improved in small fir by pruning infected branches or removing infected trees from clumps of uninfected trees. In order to effectively control dwarf mistletoe, the trees need to be sanitized every year or two for about six to ten years in order to capture latent infections.

Rachel told me she was interested in writing a silvicultural prescription for Yuba Pass Campground. I am pleased to see that the District is using silviculture to manage campground vegetation. Typically, managers try to retain all living trees in recreation areas. Often this means retaining large old trees until they die or blow over; and possibly pose a hazard for visitors. In managing vegetation in campgrounds an important consideration is tree vigor, especially during protracted periods of below normal precipitation. Trees in campgrounds are often overstocked and susceptible to bark beetle related mortality during droughts. By employing silviculture in campgrounds, tree vigor can be maintained to minimize mortality during dry spells. No bark beetle activity was observed at this time in the campground. It is wise to manage tree densities to promote tree vigor prior to protracted dry periods which stress trees and result in bark beetle build up and increased tree mortality.

Another important consideration is to encourage tree regeneration to establish replacement trees for the old-growth conifers that will eventually die. Silvicultural treatments can be used to successfully establish tree regeneration to replace old-growth trees when they die. In Yuba Pass Campground, there are areas fully stocked with old growth red fir which have no

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regeneration under them. Many of these trees are infected with annosus root disease. Eventually these old growth trees are going to die or blow over. By duplicating the chain of events that resulted in red fir regeneration in other parts of the campground, managers can remove large fir with advanced butt decay and create small openings where fir seedlings can establish. This can be accomplished over many decades, thereby retaining the healthiest old growth trees for a long time. Consideration should also be given to regenerating lodgepole pine and ponderosa pine to replace those currently present in the stand.

In summary, annosus root disease, the high densities of old-growth red fir and the lack of conifer regeneration are three conditions affecting the forest health in Yuba Pass Campground. By using silviculture to manage the trees now with a vision to the future, these conditions can be effectively treated. Aggressive hazard tree management can be used to help achieve silvicultural objectives as well as provide safety for visitors.